

What is claimed is:

1. A chip-type LED comprising a LED element and a tubular vessel accommodating the LED element therein,
5 wherein the vessel has an upper opening and a lower opening, the LED element is positioned between the upper opening and the lower opening such that the LED element emits light toward the upper opening, and the vessel is filled with a light-transmissive resin from the upper opening to the lower
10 opening.
2. A chip-type LED according to claim 1 further comprising a first lead frame and a second lead frame inserted into the vessel, wherein the first lead frame supports the LED
15 element, and the first and second lead frames are electrically connected to the LED element.
3. A chip-type LED according to claim 1, wherein the LED element emits blue light and the vessel includes a
20 fluorescent layer for converting the blue light to yellow light in the neighborhood of the upper opening.
4. A chip-type LED according to claim 1, wherein the vessel has a cylindrical inner wall extending from the upper
25 opening to the lower opening, and has an inner diameter which

is minimized at an intermediate position between the upper and lower openings and increases gradually from the intermediate position towards the upper opening and the lower opening.

5

5. A chip-type LED comprising:
a LED element for emitting bluish-purple light,
a pot-shaped cup for accommodating the LED element therein,

10 a tubular vessel having an upper opening and a lower opening and accommodating the the cup therein,
a light-transmissive member for sealing the upper opening of the vessel,

a fluorescent layer for converting the bluish-purple
15 light to yellow light, and

a first lead frame and a second lead frame inserted into the vessel,

wherein the first and second lead frames are electrically connected to the LED element, the cup is placed on
20 the first lead frame such that the light emitted from the LED element is reflected in the cup towards the upper opening, the fluorescent layer is positioned between the LED element and the light-transmissive member.

25 6. A chip-type LED comprising:

a plate-shaped insulating substrate having a bore penetrating from a front surface to a rear surface thereof, the bore having a front opening and a rear opening,

a pair of first and second wiring traces formed on the rear surface and partially extended into the rear opening,

a LED element mounted on the first wiring trace in the bore and electrically connected with the first and second wiring traces,

an insulating film formed on the rear surface to cover the first and second wiring traces and the rear opening, and

a light-transmissive member formed in the bore to cover the LED element,

wherein the insulating film has a hole leading into the bore for adding dropwise a material of the light-transmissive member into the bore through the hole.

7. A process of manufacturing a chip-type LED according to claim 1 comprising the steps of:

accommodating a LED element in a tubular vessel;
closely adhering the vessel to an adhesive tape to seal an upper opening of the vessel with the adhesive tape;
adding dropwise a light-transmissive resin through a lower opening of the vessel; and
peeling off the adhesive tape from the vessel.

25

8. A process of manufacturing a chip-type LED according to claim 3 comprising the steps of:
inserting a first lead frame and a second lead frame into a tubular vessel;
5 mounting a LED element on the first lead frame, to electrically connect the LED element to the first and second lead frames;
closely adhering the vessel to an adhesive tape to seal an upper opening of the vessel with the adhesive tape;
10 adding dropwise a light-transmissive resin containing a fluorescent material through a lower opening of the vessel to form a fluorescent layer in a neighborhood of the upper opening,
adding dropwise a light-transmissive resin through the
15 lower opening of the vessel; and
peeling off the adhesive tape from the vessel.
9. A process of manufacturing a chip-type LED according to claim 5 comprising the steps of:
20 inserting a first lead frame and a second lead frame into a tubular vessel;
placing a pot-shaped cup on the first lead frame, accommodating a LED element for emitting bluish-purple light in the cup to electrically connect the LED element to the first
25 and second lead frames;

closely adhering the vessel to an adhesive tape to seal
an upper opening of the vessel with the adhesive tape;

adding dropwise a light-transmissive resin containing
a fluorescent material through a lower opening of the vessel to
5 form the fluorescent layer in a neighborhood of the upper
opening; and

peeling off the adhesive tape from the vessel.

10. A process of manufacturing a chip-type LED according
10 to claim 6 comprising the steps of:

forming a first wiring trace and a second wiring trace
on a rear surface of an insulating substrate having a bore
penetrating from a front surface to the rear surface so that the
first and second wiring traces are partially extend into a rear
15 opening of the bore;

mounting a LED element on the first wiring trace to
electrically connect the LED element to the first and second
wiring traces;

forming an insulating film having a hole leading into
20 the bore to cover the first and second wiring traces and the
rear opening;

closely adhering the insulating substrate to an
adhesive tape to seal a front opening of the bore with the
adhesive tape;

25 adding dropwise a light-transmissive resin through the

hole of the insulating film to form a light-transmissive member covering the LED element; and

peeling off the adhesive tape from the insulating substrate.